# 651.1380 Appendix 13D—Agricultural Waste Management System Troubleshooting Guidelines

# Appendix 13D AWMS Troubleshooting Guide

## Production function

| Observed problem | Recommended actions |
|---|---|
| An unusually strong odor is present where animals are kept | Check for manure covered animals and excess manure. Animals should be cleaned and adjustments made to keep them separate from their manure.<br><br>Look for evidence of poor drainage in lot areas. If noted, improve lot drainage and consider such things as installing concrete pavement around feeders and waterers to keep lot drier. |

## Collection Function

| Observed problem | Recommended actions |
|---|---|
| An unusually strong odor is present in animal housing area | Check for spilled feed that is being allowed to ferment or areas where manure is not being routinely collected and removed. Remove these materials as a measure to reduce odors.<br><br>Check the frequency of collection. Suggest consideration be given to more frequent collection to reduce odors.<br><br>Check for manure covered animals.<br><br>Check for soiled or wet bedding. If found in excessive amounts, a more frequent removal schedule should be considered.<br><br>Consider providing additional ventilation. |

## Storage Function

| Observed problem | Recommended actions |
|---|---|
| **Waste storage pond** | |
| Pond is filled at or near capacity too early | Activate the contingency plan for emptying a portion of pond's contents to allow for future waste storage and storm events. |
| Undesired material in pond | Initiate removal prior to pumping. Take remedial measures to exclude undesired material from pond. |
| **Waste storage structure—Tank** | |
| Undesired material in tank | Assure that measures, such as sand traps and settling tanks, are in place to prevent mineral material from entering the tank. Install measures to remove undesired material if not in place.<br><br>If possible, exclude all foreign material, such as baling wire or twine, plastic bags, wood, and syringes, from the tank. Remove any materials that are found in the tank. |
| **Waste storage structure—Stacking facility** | |
| Waste will not stack | Suggest ways that the total solids of the waste can be increased, such as using less water or increasing the amount of bedding used. |

## Treatment Function

| Observed problem | Recommended actions |
|---|---|
| **Waste treatment lagoon** | |
| An unusually strong odor is present | Check pH of lagoon water (should be between 5.5 and 8.0). The optimum pH is about 6.5. Testing for pH can be done in several ways. A meter with pH electrode provides a means of making a quick and accurate test. Tests should be taken at different locations and depths to assure a pH representative of the lagoon contents. If the pH falls below 6.5, add 1 pound of hydrated lime or lye per 1,000 square feet of lagoon surface daily until the pH reaches 7.0.<br><br>Observe color of water. Very black water is indicative of low or no desired biological activity. Other colors, such as purple or various shades of brown, are indicative of water having high suspended solids content, and they normally represent proper operation. Dilution or aeration should be considered as possible ways of reducing odor.<br><br>Test composition of water. Concentrations of ammonia should not exceed 600 mg/L, and TVS should not exceed recommended loading rates. Suggest reducing loading rates, dilution, or aeration as ways to reduce odor. |
| Undesired material in lagoon | Remove undesired material from lagoon if present. |
| Floating crust | Crust formation generally does not effect the treatment function of an anaerobic lagoon; however, it does reduce evaporation from the lagoon surface. If a crust forms and if design assumed a reduction in storage requirements because of normal evaporation, early filling may result. An adjustment, such as reducing the quantity of wastewater inflow, will be required to compensate for less evaporation losses. |
| **Mechanical separation** | |
| Plugs with solids | Completely wash out the separator. Washing remaining solids from the separator after each use so solids will not dry in place may also reduce potential of plugging. |
| **Vegetative filters** | |
| Excessive buildup of solids in vegetative filter | Consider solid separation prior to discharge into filter. Regrade and revegetate if buildup of solids is affecting performance of filter. |
| Vegetation is dying or has died | Revegetate as necessary. Consider dilution of the wastewater before discharge. An alternative treatment component to treat wastewater should also be considered. |

Treatment Function—Continued

| Observed problem | Recommended actions |
|---|---|
| **Composting** | |
| Pile temperature—Temperature too low | Check moisture content of pile. Remedy is adding water or wet ingredient if pile is too dry. Add dry material and remix if too wet (moisture content of more than 60%).<br><br>Check C:N ratio of pile mix. Remedy is adding high nitrogen ingredient if the C:N ratio is greater than 50:1.<br><br>Check pH of pile. Remedy is adding lime or wood ash and remixing if pH is less than 5.5.<br><br>Observe pile structure evidenced by pile settling too quickly and few large particles. Remedy is adding bulking agent and remixing.<br><br>If weather is cold, remedy is to enlarge or combine piles or to add highly degradable ingredients.<br><br>Pile may fail to heat because of improper aeration. Aerate pile and check temperature frequently to see if it increases. |
| Pile temperature—Temperature prematurely falls consistently over several days | Indicates low oxygen. Remedy is to turn or aerate pile. Check moisture content. If low, the remedy is to add water. |
| Pile temperature—Temperature is uneven and has accompanying varying odor | Observe differences in pile's moisture content and materials. If observed the remedy is to turn or remix pile. |
| Pile temperature—Temperature gradually falls, and pile does not reheat after turning or aeration | Observe for completeness of composting as described in the O&M and Safety Inspection Guidelines, finished compost. If complete, no action is required. If composting is not complete, check for low moisture content. If low, add water. |
| Pile temperature—Pile overheating with temperatures greater than 165 °F and rising | Check the height of the composting material. It should never exceed the 5 to 7 feet range. Reducing the height will lessen the probability of spontaneous combustion.<br><br>Check for low moisture and a pile interior that looks or smells charred or if temperatures are even exceeding 180 °F. If any of these conditions are apparent, then the material should be removed from the composting bin. Do not add water to the compost as this may promote additional combustion. Avoid putting materials with dissimilar moisture contents next to each other. |

Treatment Function—Continued

| Observed problem | Recommended actions |
|---|---|
| **Composting (Continued)** | |
| Pile temperature—Pile is extremely overheating with temperatures greater than 170 °F | Check for low moisture and a pile interior that looks or smells charred. If these conditions exist, break pile down and re-pile to a reduced size. |
| Strong ammonia odor is present | Check C:N ratio and add amendment if less than 20:1.<br><br>Check pH. Add acidic ingredients and/or avoid alkaline ingredients if pH is greater than 8.0.<br><br>If large woody particles are being used as a carbon source and C:N ration is less than 30:1, use another carbon amendment or increase the carbon proportion. |
| Rotten-egg or putrid odors comes from pile continuously | Check for low pile temperature and too high moisture content. Add dry amendment if these conditions exist.<br><br>Check for low pile temperature and poor structure. Adding bulking agent is the remedy for this condition.<br><br>Check for low pile temperature and high compaction. The remedy for this condition is to remix the pile and add bulking agent.<br><br>Check for low pile temperature and insufficient aeration. Turning pile and increasing air flow are the options for improving this condition.<br><br>Check for low pile temperature and too large a pile. The pile size should be decreased to correct this problem.<br><br>Check for falling temperature and insufficient aeration. Turning the pile more frequently should improve this condition. |
| Flies or mosquitoes | Look for fresh manure or food material at pile surface and flies hovering around pile. Files or mosquito problems can be reduced by turning the pile every 4 to 7 days and by covering a static pile with a 6-inch layer of compost.<br><br>Look for wet materials stored onsite for more than 4 days. Handling raw materials more promptly should reduce this problem.<br><br>Look for nearby standing puddles or nutrient-rich pond. Grade site to drain puddles and maintain pond in an aerobic condition. |

## Treatment Function—Continued

| Observed problem | Recommended actions |
|---|---|
| **Composting (Continued)** | |
| Compost contains clumps of materials and larger particles, and texture is not uniform | Check for discernible raw materials in compost. Screening compost and improving initial mixing achieve more complete composting.<br><br>Check for wet clumps of compost. Remedy is to screen or shred compost and improve air distribution.<br><br>Look for large, often woody particles in compost. Screening, grinding, and sorting of raw materials initially improve composting.<br><br>If composted materials heat or develop odors, lengthen composting time or improve composting conditions. |

## Transfer Function

| Observed problem | Recommended actions |
|---|---|
| **Reception pits** | |
| Foreign material in pit | Check for excessive debris, which will impair function of pit. Remove debris remotely from outside the pit. |
| **Gravity pipelines** | |
| Plugging | Longer agitation, dilution, liquid/solid separation prior to transfer, and clean water flushes after transfer help reduce the potential of plugging. Installing cleanouts at locations of frequent plugging can be considered for ease of unplugging. |

## Utilization Function

| Observed problem | Recommended actions |
|---|---|
| **Land application** | |
| Crops are scum covered following application | Use a clean-water rinse following application to clean plants. |
| Soil is sealed following application | Reduce potential by lengthening drying cycle between applications, physically disturbing soil surface, or injecting waste. |
| Applied nutrients are excessive as determined by observed conditions, such as soil and leaf testing. | Change to a crop that uses a greater amount of nutrients. Use double cropping if appropriate.<br><br>Increase crop yield with improved management by such things as pretreating with lime, practicing water management, managing pests, splitting waste applications, and making timely harvest.<br><br>Take an action that would reduce the amount of nutrients produced.<br><br>Treat the waste or a portion of the waste before land application to reduce its nutrient content and to prepare if for refeeding or for use as bedding.<br><br>Locate an off-farm use for the waste.<br><br>Enlarge area on which waste is applied. |
| Health hazards | Isolate and treat infected animals to reduce the potential for high levels of pathogenic bacteria in waste material.<br><br>Apply waste on sunny days when temperatures are above 40 °F, ideally at higher temperatures, when bacterial and virus die-off is maximized.<br><br>Apply wastes to crops that will not be eaten raw or directly grazed unless adequate time is allowed for bacterial and virus die-off on the produce.<br><br>Apply wastes away from high density population area to reduce the possibility of disease transmittal by such factors as wind, insects, rodents, or flowing water.<br><br>Limit amount of waste applied to a single site to reduce the possibility of pathogenic bacterial build-up.<br><br>Apply waste when soil is not saturated and when rain is not forecast. |
| Runoff during or soon after application | Consider reducing rate at which waste is applied, applying waste only when rain is not forecast, not applying waste to snow or frozen ground, installing measures to capture runoff and return to AWMS for storage or treatment, and improving soil internal drainage by installing subsurface drainage. |